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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

In Cooperation With
MINNESOTA AGRICULTURAL EXPERIMENT STATION

FARMING IN THE LAKE STATES CUT-OVER REGION AS
REPRESENTED BY CARLTON COUNTY, MINNESOTA

A Preliminary Report

By

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PREFACE

Among the millions of returning members of the Armed Forces and displaced war workers, many will be interested in the possibilities of agriculture as a means of making a living and as a mode of life. Some of them will want to know about the possibilities of the cut-over area as a place to settle. The abounding recreational attractions there, in the form of fishing and hunting, and the relatively low (not necessarily cheap) price of land are likely to arouse interest.

This report presents information gathered by the author and gives such analyses of it as he had completed at the time he went into military service. Although the analysis is not complete--in that it does not show the income expectancy of typical cut-over farms under wartime conditions nor under assumptions regarding post-war conditions--it can be helpful to those who are or may become interested in the farming opportunities in the cut-over area of Minnesota, Wisconsin, and Michigan. It describes typical farm organizations as they existed in 1940 in a part of the area, tells how families there made their living in agriculture, and tells something about their level of living. It describes by means of the farm budget what the income possibilities were on different sizes of farms just before the war. It gives an appraisal of the possibilities of the area at that time as a place to make a living by farming.

The picture as developed in the study is not wholly favorable nor is it wholly unfavorable. Farm incomes were and probably will continue to be small, on the average, but a very satisfactory living may be obtained here under favorable circumstances. Either of the agencies that cooperated in the study will assist anyone who wishes to consider further the possibilities of the cut-over area as a place to settle.

The opportunities for recreation and for the rehabilitation of the disabled or partially disabled veteran who has disability compensation are not covered by this study. Nor is there discussion of the individual and social consequences of settlement in isolated locations on land unsuited to farming. These important problems should be thoroughly investigated by those who may think of settling in this area.

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BY CARLTON COUNTY, MINNESOTA

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1/ Suggestions and criticisms throughout the study and preparation of this report were given by G. A. Pond, Minnesota Agricultural Experiment Station and by Frank T. Hady, Bureau of Agricultural Economics.

INTRODUCTION

In many respects farming in Carlton County is similar to farming in other counties in the cut-over sections of Minnesota, Wisconsin, and Michigan. This report, therefore, may have much wider application than merely to the one county.

So that those who are interested may have a better understanding of the possibilities and limitations and of the problems faced by local farmers, this report (1) describes and analyzes the agriculture of Carlton County and (2) analyzes and illustrates the possibilities in the future of combining farming with other occupations as a means of livelihood.

Most of the agricultural development in this county has taken place during the last 40 years. Many of the early settlers were lumberjacks who stayed after the lumbering industry had exhausted the virgin timber and moved on. During its 40-year development, agriculture has drawn people from large cities such as Chicago, Milwaukee, and Minneapolis; from outside areas such as the iron range in Minnesota and upper Michigan and the agricultural areas to the south; and from Europe, particularly the Scandinavian countries and Finland. The generation which followed the early settlers is now being gradually replaced by a third generation.

There are about 2,500 farms in the county. Some are well-developed family-sized farms, many are too small to support a family, others are only places of residence of the owners who are employed elsewhere. During the depression of the 1930's there was a flurry of land development; probably 300 to 500 new farms appeared between 1930 and 1935. But then the number of farms declined from the 2,594 reported in the Federal Census in 1935 to 2,510 reported in 1940. During this period the acreage in farms decreased from about 234,000 acres to 222,000 acres and the acreage used for crops from about 75,000 to approximately 68,000 acres. These figures suggest that although land is being cleared and new farms are being developed, other farms are being abandoned. In the county, certain clearings, old wells, and remnants of foundations of buildings are mute evidence of abandonment.

As in much of the cut-over country, the farming is typically hay and dairying. Duluth, located just outside the county, provides a fluid-milk market for perhaps 300 nearby Carlton County farmers, but the major portion of the dairy production is sold as separated cream to local creameries. A few farmers grow truck crops and small fruit, notably strawberries and raspberries, for local sale.

For agricultural purposes nature was not particularly generous to this county. Soils are of uneven quality, and the climate limits both the variety of crops that can be grown and the yields of crops.

Broadly classified, the soils are of two types--the sandy loose-textured soils and the heavy loam or clay soils. Three major soil areas, in descending order of extent, are (1) a complex of stony loam, peat bogs, sandy plains, and ridges, (2) lacustral soils adjacent to Lake Superior which are prevailing a heavy reddish gray clay underlain by a heavy red subsoil, and (3) extensive peat bogs, which are naturally water-logged, which after being drained are unproductive until fertilized. Topography varies from level to rough and steep.

Climate is temperate with rather long, cold winters and short summers. The length of growing season varies from 90 to 120 frost-free days in different parts of the county. Killing frosts are recorded in every month of the year at Cloquet, so that frost is always a potential hazard. Average annual precipitation is 27 to 28 inches, most of which occurs during the warmer months.

METHOD OF STUDY

About 130 farmers were interviewed in the summer of 1940 and information was obtained covering the previous year, concerning the land use, cropping system, livestock system, power, machinery, and other equipment, the farm buildings, the age of and work done by each member of the family, the amount and value of products sold, and an itemized account of the farm expenses.

In addition, the following facts were obtained for each sample farm from records in the county office of the Agricultural Adjustment Agency: (1) Acreage of each crop for each year from 1937 to 1940, (2) number of dairy cows in 1938, and (3) average number of dairy cows for the period 1933-37. These figures were especially useful in determining the usual types of farm organization.

Classification of Farms

Farms were first classified according to size of farm business measured in terms of man days of productive work 2/, and then subsorted on the basis of cropland acres per farm. 3/ The first classification gave a separation between full-time farms and part-time farms as they are now organized; the second follows a more familiar measure of size of farm.

2/ This is the usual 10-hour man work unit.

3/ Cropland is agriculturally by far the most productive type of land. The amount of it roughly determines the quantity of feed produced, and therefore the size of the dairy herd. Owing to its importance and to the fact that farms vary widely in percentage of land in crops, cropland is a better measure of farm size than total land.

In this study any farm which furnished 250 or more man days of work was classified as a full-time farm, those with 75 to 249 man days as part-time farms, and those with less than 75 man days as residence farms.

The distribution of surveyed farms according to kind and size is found in table 1. Of the 129 surveyed farms, 92 fell in the full-time group, 22 in the part-time group, and 15 in the residence group. Sorted on the basis of crop acres, there were 33 farms with less than 20 crop acres, 56 farms with 20 to 39 crop acres, and 40 farms with 40 and more crop acres. Most of the full-time farms had more than 20 crop acres and all of the part-time and residence farms actually had less than 30 crop acres (table 1 and fig. 1).

A few of the operators on full-time farms had some non-farm employment, and when necessary other members of the family carried on the farming. Part-time farms employ the operator for only a part of the year or a part of each week day throughout the year. Part-time carpenters are representative of the first group and milk-truck drivers are representative of the second. Some farms occupied by families that were receiving public assistance but doing some farming were classified as part-time farms. Residence farms employed the operators to a very limited extent and the families depended almost entirely on non-farm employment. Farms occupied by operators receiving old-age assistance or other public aids as their primary sources of income, were also classified as residence farms. In general, the farming on residence farms consisted of producing food and fuel for home use.

Table 1.- Number of survey farms, by kind and size,
Carlton County, Minnesota, 1940

Size of farm	Kind of farm				Total
	Full-time	Part-time	Residence		
	<u>1/</u>	<u>2/</u>	<u>3/</u>		
<u>Crop acres</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>		<u>Number</u>
Under 20	11	11	11		33
20-39	41	11	4		56
40 and over	40	---	---		40
Total	92	22	15		129

- 1/ Farm business furnishing 250 or more man days of work.
2/ Farm business furnishing 75 to 249 man days of work.
3/ Farm business furnishing less than 75 man days of work.

This system of classification is used throughout this report. At certain places only one or the other method of sorting was sufficient for the particular analysis.

ARRAY OF 129 SURVEY FARMS BY KIND OF FARM AND ACRES OF CROPLAND (EACH VERTICAL BAR REPRESENTS ONE FARM)

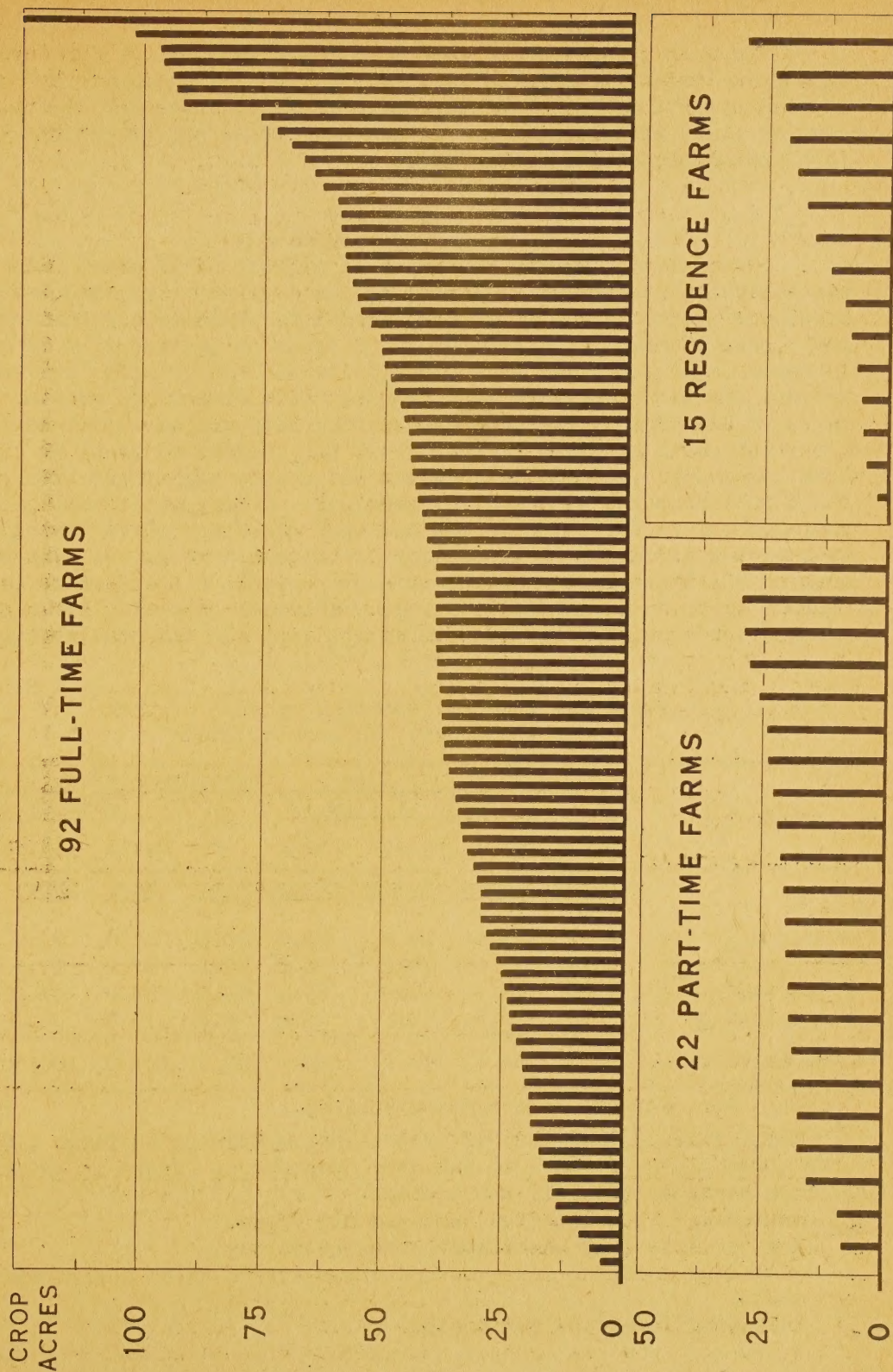


Fig. 1

FARM ORGANIZATION AND OPERATION IN 1940

To understand the problems associated with the use of agricultural resources it is necessary to view critically their present use and state of development, to learn why they were thus developed and why they are used in their present manner. It was with these considerations that the following analyses were undertaken.

Land Use

Farms in the survey contained an average of 98 acres with about one-third (an average of 35 acres) of the land in crops (table 2). The remainder of the land was pasture, woodland, wasteland, farmstead, lanes and roads. There was an average of 58 acres of pasture land of which 17 acres were classified by the Agricultural Conservation Program as open pasture and 41 acres as brush or woods. Land classified as open pasture included all that supported a substantial sod, and was often made up of scattered small clearings. Some of it was lowland adjacent to swamps, and some was stony. For various reasons not nearly all of the open pasture could be considered as potential cropland. A part of it sometimes is not pastured but is harvested as hay but such clearings often cannot be reached with a team and mower so if the hay is harvested it is cut with a scythe. Much of the brush pasture might more properly be classified as woods, because it produces so little forage. Woodlots generally are not well managed and in most cases farmers do not keep out the grazing livestock.

Table 2.- Land utilization, by size of farm,
Carlton County, Minnesota, 1940

Land use	Acreage per farm				Percentage of land in farms			
	Size of farm 1/				Size of farm			
	All farms	Small	Medium	Large	All farms	Small	Medium	Large
	Acres	Acres	Acres	Acres	Pct.	Pct.	Pct.	Pct.
Cropland 2/	35.7	12.5	29.8	62.4	36.5	23.2	33.4	43.1
Open pasture 3/ ..	16.8	9.5	15.2	24.6	17.2	17.8	17.1	17.0
Brush pasture 4/ ..	40.6	28.1	40.0	51.4	41.4	52.3	44.8	35.5
Other land 5/ ...	4.8	3.6	4.2	6.5	4.9	6.7	4.7	4.4
Land in farms ..	97.8	53.7	89.2	144.9	100.0	100.0	100.0	100.0

Source: Agricultural Conservation Program.

1/ Small farms = less than 20 crop acres; medium sized farms = 20 to 39 crop acres; large farms = 40 and over crop acres. There is an average of 27 crop acres per farm in the county.

2/ Including all cultivated land and hay crops.

3/ Some of this land sometimes harvested as hay.

4/ Including woodland reserved under the Agricultural Conservation program and waste.

5/ Including farmstead and roads.

Although the average farm had 35 acres of cropland, actually two out of five farms had less than 20 crop acres and only one out of five had more than 40 (table 3). In general, the smaller farms (in terms of cropland) had a smaller proportion of the land in crops and a larger proportion of land in pasture than the larger farms (table 2).

Cropping System

As elsewhere in the cut-over country, hay is the most important crop, occupying 70 percent of the land used for crops in this county (table 3). The average farm in the survey had about 25 acres of hay, most of which was a mixture of clover and timothy, but there was some evidence that the alfalfa acreage is increasing. Farmers have been encouraged by the Agricultural Conservation Program to plow up old hay fields and reseed them with legumes. Even so there are many fields which have not been reseeded for 15 or more years. Next to hay in importance are the small grains with an average of 6 acres per farm. Oats made up most of the small-grain acreage; barley, wheat, and rye had lesser acreages.

Table 3.- Distribution of crops by size of farm, 129 survey farms, Carlton County, Minnesota, 1940

Crop or land use	Acreage per farm				Percentage of cropland			
	All	Small	Medium	Large	All	Small	Medium	Large
	farms	farms	farms	farms	farms	farms	farms	farms
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Percentage of all farms	100	44	36	20				
	Acres	Acres	Acres	Acres				
Tame hay	24.7	9.7	22.4	39.7	70	77	75	63
Small grain	5.6	1.3	4.1	11.2	16	10	14	18
Corn	0.6	0.2	0.6	1.2	2	2	2	2
Potatoes	2.0	0.8	1.7	3.5	6	6	6	6
Cabbage and rutabagas:	0.5	0.2	0.2	1.2	1	2	1	2
Rotation pasture	0.5	---	0.1	1.3	1	---	1/	2
Wild hay	1.6	0.2	0.7	3.9	4	2	2	6
Idle plowland	1/	1/	---	---	1/	1/	---	---
Garden	0.2	0.1	1/	0.4	1/	1	1/	1
Total cropland	35.7	12.5	29.8	62.4	100	100	100	100

Source: Agricultural Conservation Program, measured acres, 129 sample farms.

1/ Less than 0.1 acre or 0.1 percent of cropland.

The average farm had 2 acres of potatoes. This crop is well adapted to the climate and soils of the area and helps to absorb what would otherwise be the surplus of family labor. Some potatoes are sold locally but most of them are trucked to distant markets. Cabbage is grown in the east central part of the county on light soil with a fairly deep subsoil; most of it is also sold outside the county. In the past rutabagas were an important cash crop but now they are grown mostly for dairy feed. The growing season is too short for even the earliest varieties of corn, and most of the very small acreage now grown is harvested as fodder. Even if hybrid corn is developed for this area, corn growing would probably not be stimulated much because of the frost hazard.

Hay occupied a larger percentage (77) of the cropland on the small farms than on the larger farms (63 percent) and the percentage of cropland in small grains was lower on the small farms (10 percent) than on the large farms (18 percent). The other crops occupied about the same percentage of the cropland regardless of the size of the farm.

Livestock System

Dairy cattle are by far the most important livestock in Carlton County (table 4). On typical farms there are 5 to 8 cows. Dairy herds on the average are of comparatively high quality and the average annual production per cow is about 200 pounds of butterfat whereas the State average is 185 pounds. Most herds are of Guernsey breeding, and the Barnum area is well known outside the county for its purebred stock. Most herds are bred for fall freshening with the major portion of the milk production occurring while the cows are on dry feed. Although farmers grow most of the hay, they buy most of the grain fed to dairy cows. On the larger farms more of the feed grain is produced and less is bought than on the smaller farms.

Few of the farmers who have less than 7 or 8 cows keep a dairy bull. They hire the breeding service from the larger dairy farmers. There are several cooperative bull associations in the county, the membership including some of the larger dairymen as well as small farmers. The associations probably had herd improvement rather than economical bull service as their original objective.

Poultry is a minor enterprise in the county and on most farms merely supplies the household. Many farms have no poultry at all but the typical farm has about 25 hens (table 4). On a few farms poultry is a commercial enterprise with 100 to 150 hens, and on still fewer farms it is a major enterprise with 200 or more hens (92 farms were classified as poultry farms by the Federal Census in 1930). During the period 1920-30, when poultry was not so generally kept on farms, farms producing eggs commercially were more numerous than now.

Few farmers have sheep. During the settlement period, sheep helped to clear the land and keep down brush sprouts, but as land-clearing operations have declined and there is less free range, sheep have lost their former place in the farm economy and the total number has declined since 1930.

Table 4.- Average number of various livestock produced per farm, by size of farm, 129 survey farms, 1940

Size of farm	Number of farms in group	Dairy cows	Other cattle	Hogs produced	Hens kept 1/
Crop acres	Number	Number	Number	Number	Number
Under 10	12	4	3	1	2/ 28
10-19	21	5	3	1	13
20-29	30	6	5	1	13
30-39	26	9	7	3	27
40-49	14	10	8	2	58
50-59	12	11	7	3	39
60-79	7	17	9	8	66
80-99	5	16	11	6	26
100 and over ...	2	20	11	6	38
Average 3/ ...	129	7	5	2	25

Source: Farm-Forestry Survey.

- 1/ During winter laying season. July 1 inventories are low on many farms and not representative of the poultry enterprise.
 2/ Including one large poultry farm which greatly affects the average.
 3/ Weighted according to number of all farms in county in each size group.

Hogs are produced primarily for family consumption--there was an average of only 2.1 produced per farm. In each community a few farmers keep brood sows and sell most of the pigs at weaning time to neighbors who raise them for family use. Very few farmers with less than 40 crop acres raise hogs for sale (table 4) and the average number produced on such farms is no more than enough to supply home needs. With very limited grain production, this area cannot compete with the Corn Belt in the production of hogs, and few are shipped out of the county.

There is considerable variation from farm to farm in the number and kind of livestock kept but in general the number varies directly with the size of farm (table 4). A close relationship exists between the number of cows and crop acres per farm. In general, there are 4 crop acres to each dairy cow although the ratio of cows to crop acres is slightly higher on the small farms and slightly lower on the large farms. The relationship between crop acres and number of other cattle is somewhat less uniform. The data indicate a direct relationship between crop acres per farm and the number of poultry kept but actually a causal relationship does not exist as practically all poultry feed is bought. One might expect that operators of small farms especially would keep poultry to use surplus labor and increase the size of their business, but actually there is surplus labor even on most of the larger farms. As poultry is found on various farms regardless of size apparently only those operators who are skilled in poultry management keep them as a commercial enterprise.

Power and Machinery

In general, the farmers in Carlton County have much less power and machinery than farmers in central and southern Minnesota. Even so, whatever is available is generally adequate for the present scale of farming, because the crop acreage per farm is small and much of the cropland is in hay. Cooperative ownership and use of machinery are very common, as is also the practice of exchanging labor. Together these practices explain why farmers get along with so few pieces of equipment.

The typical farmer has two horses but three out of ten in the survey had no horses (table 5). One out of ten had one horse, and one out of ten had either three or four horses. Farmers with but one horse usually can borrow another from a neighbor whenever it is needed. Horses are used relatively few hours per year compared with southern Minnesota and feed costs are not excessive as horses are generally fed grain only during the summer work season. They are on pasture until late fall and are wintered on hay of comparatively low quality.

Table 5.- Number of farms in survey without horses, and with one, two, three, or four horses, by size of farm, Carlton County, Minnesota, 1940

Size of farm	All farms	Farms with -				
		No horses	One horse	Two horses	Three horses	Four horses
Crop acres	Number	Number	Number	Number	Number	Number
Under 10	12	8	1	3	---	---
10-19	21	8	5	8	---	---
20-29	30	12	4	14	---	---
30-39	26	5	1	16	2	2
40-49	14	2	---	7	5	---
50-59	12	---	1	7	1	3
60-79	7	---	1	3	2	1
80-99	5	1	---	---	2	2
100 and over ...	2	---	---	1	1	---
Total	129	36	13	59	13	8

Source: Farm-Forestry Survey, 1940.

Although horses have always been the most important source of power, some operators now have small one-plow or two-plow tractors. They are usually found on the larger farms (40 or more crop acres) and the owners usually do plowing, drilling, grain binding, and the like, for neighbors, at a standard charge per hour or per acre. Many of the tractors now in use were bought second-hand from farm-implement dealers who shipped them into the county. Some of the older tractors were originally bought for breaking brushland. Most of those bought recently are of the general-purpose type and undoubtedly many buyers of the more expensive machines expected to do custom work to pay for some of the overhead costs.

In recent years some farmers have made their own tractors from discarded trucks or motorcars. This type of tractor probably is now used by one out of five of the farmers in the county. It is becoming more popular each year, and seems to fit small-scale farming very well. These tractors are quite sturdy and can be used for almost every operation for which horses are used. They are most common on farms with less than 40 crop acres (table 6).

At first, a home-made tractor was usually built by the farmer himself from a discarded automobile. The frame was shortened and the rear wheels were moved forward to permit a shorter turning radius. The machine was driven in low gear or a second transmission was installed to reduce the speed. Soon it was found that tractors made from trucks are more sturdy, have more power, and generally are more satisfactory. Recently local blacksmiths and automobile mechanics have turned to building these machines. It is now common to see several home-made tractors for sale at garages, machine shops, and farm-implement dealers' establishments in the county. The home-made tractor well fits the needs of the farmer on a small cut-over farm because the investment is low (50 to 100 dollars) and the operating cost is moderate. They are likely to continue to be a favorite source of power in the area.

Table 6.- Number of farms in survey without tractors, farms with tractors, and farms with home-made tractors, by crop acres per farm

Size of farm	All farms	Farms without tractors	Farms with tractors	
			Factory built	Home-made ^{1/} tractors
Crop acres	Number	Number	Number	Number
Under 10	12	8	2	2
10-19	21	17	---	4
20-29	30	21	2	7
30-39	26	18	3	5
40-49	14	8	5	1
50-59	12	7	3	2
60-79	7	1	6	---
80-99	5	2	2	1
100 and over	2	1	1	---
Total	129	83	22	24

Source: Farm-Forestry Survey, 1940.

^{1/} Some farms had more than one home-made tractor.

Very few farmers in the county have a complete line of machinery and equipment for crop production for most machines are used only a few hours each season; farmers cannot afford a complete line. Plows, harrows, and other tillage implements and haying tools such as mowers, rakes, and wagons are the machines most commonly owned (table 7). Grain drills, grain binders, and other expensive machines are found only on the larger farms.

There is a direct relation here between the size of the farm and the completeness with which it is equipped (table 7). On 6 of the 12 farms with less than 10 crop acres there was no machinery and on the other 6, tillage and haying tools were the only items. As the acreage of crops increases more of the farms have grain drills, grain binders, potato planters, potato diggers, and so on.

The problem of getting the use of machines not generally owned has been met rather satisfactorily through partnership owning, renting, and borrowing. Potato machinery is often owned in partnership by three to six neighbors. No dissatisfaction with this arrangement was expressed by any of the farmers interviewed. Occasionally grain drills and grain binders are owned in partnership but more frequently they are owned by one farmer alone and rented to his neighbors at a standard rate per acre worked. Sometimes the use of one machine is exchanged for the use of another and no charge is made.

Some farmers with little or no power and machinery hire others to do some machine work and so the practice of custom work has developed. The farmer doing custom work furnishes the power and the machine, operates the rig himself, and charges a standard rate per acre or per hour. This is most common in the case of plowing, and in drilling and binding grain. Some farmers do more machine work for others than for themselves and greatly reduce their overhead costs; a few, scattered over the county, do little farming and make most of their living by doing custom work with good equipment--they perform the work quickly and efficiently.

Farm Buildings and Equipment

Farm buildings and incidental equipment for the most part are adequate for the present scale of operation in the county. On many farms there is far more space for dairy cows and other livestock than is actually used or needed. This is particularly true on farms occupied by the rather aged, those receiving old-age or other kinds of public assistance, and those who have considerable non-farm employment. The size and the condition of many farm buildings can be explained in part by the fact that many were built after the Cloquet fire which swept the county in 1918. Farmers whose buildings were destroyed received indemnities from the Federal Government because it was found that the fire was started by a railroad locomotive while the Government was operating the railroads. In many instances the present buildings are probably far better than could be financed out of current farm income.

In general the farm buildings are well equipped for dairying. Most dairy barns have wood or concrete floors, good stanchions and feeding troughs. In many instances water is piped into the barn where the cows are kept for several weeks during the winter. Very few barns have milking machines, which are not necessary considering the size of the herds and the adequate labor supply on most farms. Barns are usually of frame construction although some log buildings are still in use.

Table 7.- Number of farms having specified machines, by acres of cropland, 129 survey farms, Carlton County, Minnesota, 1940

Crop-land per farm	All farms	Tillage machinery						Hay tools		Potato tools		Grain tools		Corn tools		No machinery
		Plow	Disk	Spike tooth	Spring tooth	Cultiva-tor	Wagon	Mower	Rake	Planter	Sprayer	Dig-ger	Drill	Binder	Planter	
Acres	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Under 10:	12	4	1	3	3	2	5	5	5	---	---	---	---	---	---	6
10-19 :	21	17	11	10	12	15	18	17	17	1	---	---	---	---	---	2
20-29 :	30	24	16	12	14	22	26	26	26	2	1	2	2	---	---	4
30-39 :	26	26	15	13	20	22	26	26	26	5	2	2	8	---	---	---
40-49 :	14	14	13	14	13	14	14	14	14	6	5	6	8	2	2	---
50-59 :	12	12	9	9	12	12	12	12	12	5	4	6	6	1	1	---
60-79 :	7	7	6	6	7	7	7	7	7	3	1	3	7	1	---	---
80-99 :	5	5	4	4	5	5	5	5	5	4	---	4	3	---	---	---
100 and over :	2	2	2	1	2	2	2	2	2	2	---	2	2	---	---	---
Total :	129	111	77	72	88	101	115	114	114	28	13	28	34	35	4	12

Source: Farm-Forestry Survey, 1940.

Other than the barn and the farm home, the Carlton County farmer has few other buildings and has little use for them. Log hay barns are commonly located on hay meadows. If there are only a few chickens, they are usually kept in the same barn as the livestock, but farms with a poultry enterprise usually have a special building.

INCOME OF FARM FAMILIES IN CARLTON COUNTY

Income from Farming

Dairying is the largest single source of farm income and from it came about two-thirds (64 percent) of the total farm cash receipts in 1939-40 (table 8). If sales of cattle and calves are combined, the dairy enterprise accounted for nearly four-fifths (77 percent) of the total receipts. The cattle sold consisted mainly of cull dairy cows but some breeding cattle and veal calves were included. Other livestock (mostly hogs and poultry) accounted for 6 percent and crops accounted for about 13 percent of total cash income. Forest products, Agricultural Conservation Program payments, and miscellaneous items made up the remaining 4 percent.

There was little variation among the three size groups of farms in the distribution of receipt from various products. This fact reflects the striking similarity of farm organization regardless of farm size. Although dairy products accounted for 60 percent of the total receipts on large farms, 70 percent on medium farms, and 62 percent on small farms, the differences are not highly significant. On the small farms the sales of cattle and calves and of poultry and eggs were relatively larger than on the large farms; on the latter the sales of crops were more important--mainly potatoes and cabbage.

The average total value of sales in 1939-40 was \$360 on the small farms, \$790 on the medium size farms, and \$1,709 on the large farms, with an average of \$964 for all farms in the survey.

A summary of the farm cash expenses with averages for the three size groups and for all farms is shown in table 8. Only those expenses where cash was actually paid out were included. Purchase of feed for livestock was the largest single item with an average of \$140 per farm, which was nearly one-third (29 percent) of the total farm cash expense. Feed constituted a higher proportion of the expense on small farms (38 percent) than on medium size farms (28 percent) and on large farms (26 percent). This variation can be explained in two ways: The small farms had a higher ratio of livestock to land and some operators who had outside work preferred to buy feed rather than spend their time and labor growing grain.

The feed that farmers buy is shipped into the county so it must have a relatively high feed-unit value to minimize transportation costs. Commercial protein feed, various commercial dairy rations, ground barley, and corn are the most common. Small grains are seldom bought in the form that they come from the farm but are usually ground. Feeds are distributed by cooperative general stores and creameries and by feed stores. Most farmers buy only a few sacks each time they market some produce.

Table 8.- Average cash income and cash expenses, by size of farm,
129 survey farms, 1940 ^{1/}

Item	All farms		Size of farm							
			Less than 20 crop acres		20 to 39 crop acres		40 and over crop acres			
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
<u>Cash Income</u>										
Dairy products	616	64	222	62	551	70	1,031	60		
Cattle and calves ..	127	13	68	19	120	15	185	11		
Hogs	9	1	2	1	4	1	23	1		
Sheep and wool	3	---	---	---	1	---	10	1		
Poultry and eggs ...	51	5	47	13	26	3	89	5		
Potatoes	54	6	7	2	38	5	116	7		
Other crops	64	7	2	1	8	1	193	11		
Forest products	5	---	2	1	10	1	2	---		
AAA payments	28	3	9	2	23	3	49	3		
All other	7	1	1	---	9	1	11	1		
Total	964	100	360	100	790	100	1,709	100		
<u>Expenses</u>										
Seed, fertilizer ...	19		6		16		33			
Threshing and machinery hire ...	14		7		14		21			
Other crop expense :	4		1		4		8			
Feed purchased	140		97		114		211			
Miscellaneous live-stock expense	9		4		9		13			
Machinery and building repairs ..	24		9		21		39			
Hired labor	42		10		26		92			
Auto, truck, tractor:	72		21		62		128			
Taxes, rent, interest, insurance:	90		50		78		138			
Livestock bought ...	19		9		22		24			
Electricity	24		21		16		37			
All other	19		14		14		30			
Total	476		249		396		774			
Net cash income	488		111		394		935			

^{1/} For the 12-month period July 1939 to June 1940.

Second to feed expense in importance are the fixed expenses including taxes, rent, interest, and insurance. The four combined averaged \$90 per farm which was about 18 percent of the total farm cash expense.

Expense for hired labor averaged \$42 per farm--\$10 on the small farms, \$26 on the medium size farms, and \$92 on the large farms. Most of the hiring was for harvesting the hay, a job requiring two or more workers. Thus, many farmers must hire labor even though their business is small and the annual labor need is low. When neighbors exchange work no cash is involved.

The average net cash income per farm was \$488; it was \$111 on small farms, \$394 on medium size farms, and \$935 on large farms. This was the amount of cash from farming which was available for family living. The cash farm expenses do not include any interest on the farmer's equity in the farm capital or any charge for depreciation on buildings, fences, and equipment. Had charges for these items been deducted in the calculations, the net income would have been small indeed.

Farm Products Used in the Home

In addition to cash income from farming, there is non-cash income in the form of food and fuel which are used by the family. This production is often a considerable part of the family income but its importance is often minimized, by farmers and others alike. Compared with the average net cash farm income of \$661, farm products consumed by the average farm family in the survey were valued at \$172 (at farm prices). At retail market prices the value of these products probably would have been double this figure, or about \$350.

Among the surveyed farms, dairy products account for about one-third of the value of farm produce used in the home (table 9). The average family consumed 1,177 quarts of whole milk (skim milk was not estimated), 163 pints of cream, and 34 pounds of butter. Almost every family kept at least one cow--only four families had none. Only about one out of four reported that they churned butter. Usually, those who did sold no dairy products and they churned only what the family did not need as milk and cream. Those who sold cream usually bought butter because as patrons they had a concession in price at the creamery. Families that had only one or two cows usually had to buy dairy products a part of the year, when the cows are not giving milk.

About three out of five families (58 percent) reported producing poultry products for home use; the average was 70 dozen eggs and 34 pounds of dressed poultry per family. All families reporting poultry products used some eggs, but about one out of four did not report using poultry meat. In such cases only enough hens were kept to supply the family with eggs.

Among the 64 farmers who kept hogs, all but two reported butchering for home use. The average amount per family was 197 pounds (dressed weight) and the average farm value was \$20. Many families bought one or two pigs each and raised them on skim milk, potatoes, garbage, and a little purchased grain.

Table 9.- Average quantity and value per farm of products^{1/} used in the home, by size of farm, 129 survey farms, 1940 ^{1/}

Item	Unit	Quantity			Value ^{2/}	
		Average:	Farms	Range on	Average:	Per-
		per	reporting:	farms	per	centage
		farm		reporting:	farm	
		Number	Number	Number	Dollars	Percent
Whole milk	Qt.	1,177	118	360-3,650	41	23
Cream	Pt.	163	79	60- 730	8	5
Butter	Lb.	34	30	40- 360	10	6
Eggs	Doz.	70	71	24- 208	13	8
Poultry ^{3/}	Lb.	34	53	18- 600	7	4
Hogs ^{3/}	Lb.	197	79	70- 840	20	12
Cattle and calves ^{3/}	Lb.	107	27	60- 800	13	7
Sheep ^{3/}	Lb.	3	2	140- 200	^{4/}	---
Root crops ^{5/}	Bu.	^{4/}	5	4- 15	^{4/}	---
Potatoes	Bu.	24	127	6- 52	12	7
Vegetables and fruit ^{5/}	Qt.	117	122	30- 350	17	10
Fuel wood	Cd.	12	114	2- 35	31	18
Total					172	100

^{1/} For the 12-month period July 1939 to June 1940.

^{2/} At farm prices.

^{3/} Dressed weight.

^{4/} Less than 0.5.

^{5/} Stored for winter use; no estimate was made of produce used directly from the garden.

Forty-nine farmers reported that they butchered cattle or calves for home use; the average quantity for all farms was 107 pounds (dressed weight).

Almost every family had at least a small garden. No attempt was made to estimate the amount or value of produce used directly from the garden but families were asked to report the fruit and vegetables canned. For the 122 families which reported having canned fruit and/or vegetables, the average was 117 quarts per family. All but one reported having raised potatoes for home use and the average per family was 24 bushels.

Wood is the universal fuel in the county for heating farm homes. Eighty-eight percent (114) of the farmers surveyed reported having cut wood for family use. The average amount cut per farm was 12 cords. For many, Carlton County farmers' fuel wood is becoming a difficult problem because no one manages the woodlot for production. The woodlot on many farms is too small to supply the needs of the family on a sustained-yield basis. With a potential yield of one-fourth to one-half cord per acre under good management, the average family would need a woodlot of 25 to 40 acres. In the present state of woods depletion even greater acreage is needed. Not all of the fuel wood used on farms in the survey was produced

on the operator's land. Many bought stumpage either from private owners or in the State forests. The State permits farmers to take dead and down timber at a nominal price per cord; it is not of as high quality as large standing timber but it is often less effort for the farmer than working his own woodlot. Another indication that fuel wood is becoming scarce is the fact that stumps removed in land clearing are now worked up as fuel whereas formerly they were burned in the field.

Blueberries and some other small fruits--such as wild raspberries and wild strawberries--grow abundantly on the extensive wild land in the county. Most families add to their living by picking wild berries, especially blueberries.

It might be expected that families with very low cash incomes would make every effort to raise food for themselves. With this possibility in mind, the relation was tested between net cash income per family and value of farm produce used in the household, but no very close relationship was found. The schedules were sorted according to number of persons per family and each group was examined separately. There was no closer relation between the two factors when only full-time farms were examined than when other types also were included. If low-income families did try to produce for themselves as much subsistence as possible, there were evidently offsetting circumstances or conditions in this area.

There was a close relationship between the size of household (including all persons regardless of relationship to the operator and family) and the value of farm produce used (table 10). The data show that the greater the number of persons per household, the greater the value of produced goods used. 4/ The average for families with 2, 3, 4, and 5 persons was \$117, \$166, \$180, and \$212, respectively.

Table 10.- Relation between size of household and value of farm produce used, 129 survey farms, 1940

Value of : produce : (dollar) :	Persons per household											Total
:	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8 :	9 :	10 :	11 :	:
0- 99 ...:	4	9	3	4								20
100-199 ...:		15	27	15	8	1	1	3				70
200-299 ...:		1	7	9	6	2		2				27
300-399 ...:			1	3	2		2			1		9
400+:								1		1	1	3
Total .:	4	25	38	31	16	3	3	6	---	2	1	129

4/ The value of r_{xy} is 0.70 assuming size of household the independent variable; the standard error is 0.04 using the formula, $r = \frac{1 - r^2}{V N}$.

Apparently rural families in Carlton County use at home all that they need of the commodities ordinarily produced for sale but, in general, they do not set up enterprises for the expressed purpose of supplying the family. Further evidence is found in the fact that the value of produce used increased with size of farm (table 11) and of course the larger the farm the greater the variety of enterprises it is likely to have.

Table 11.- Average value of produce used per farm, and per capita, survey farms, Carlton County, Minnesota, 1939-40

Crop acres per farm	Number of farms	Average value of produce used	
		Per farm	Per capita
	Number	Dollars	Dollars
Under 10	12	144	35
10-19	21	168	40
20-29	30	120	41
30-39	26	185	47
40-49	14	203	60
50-59	12	211	55
60-79	7	223	51
80-99	5	254	51
100 and over	2	209	42

Income from Non-Farm Sources

The figures on farm income among these families seem extremely small. The situation of these rural people would be rather serious except that many who live on farms in Carlton County have other jobs besides farming, and some families are receiving public assistance. If it were not for supplementary income many people would have a very meager living and this is especially true of those having little cropland. But on the other hand, it may be said that many of the families would not try to make their entire living on so little land and are here only because they have other employment.

In table 12 the non-farm cash income has been summarized according to the source, for the three size groups of farms. Of the two general classes of income--employment and all other (largely public assistance)--employment furnished by far the greater income. Only the employment of the immediate family was included in these figures; any employment of the housewife and of any other members of the family if their earnings went into the family purse. In a few instances a married son and his family lived in half of the house and he had a non-farm job; in other cases an unmarried son or daughter boarded at home but did not contribute to the family living as the board was furnished them at cost. In none of these cases was the income of such persons included in these figures. Even if it had been the results would have been almost the same.

The average income from non-farm labor of the operators on farms of less than 20 crop acres was \$436. This was about 2-1/2 times the average of the 20 to 39 crop-acre group, and about 5 times the average of the 40-and-over acre group. Many of those in the group of small farms had full-time jobs. Of the 33 operators in this group, 25 worked at least a part of the time off the farm. This group also had the highest average amount of public assistance in relief, old-age assistance, and the like. The sample was too small to reveal the relative importance of particular types of public assistance in the county.

The average non-farm income from all sources was \$373. For farms of less than 20 crop acres it was \$548; those with 20 to 39 crop acres, \$295; and those with 40-or-more crop acres, \$116.

Table 12.- Average non-farm cash income per farm by size of farm, 129 survey farms, 1940 1/

Item	Size of farm			
	All farms	Less than 20 crop acres	20 to 39 crop acres	40 and over crop acres
	Number	Number	Number	Number
Number of farms	129	33	56	40
	Dollars	Dollars	Dollars	Dollars
Labor off farm				
Operator - private	277	436	187	82
WPA	11	25	2/	2/
Family - private	30	9	62	18
WPA	4	---	10	---
CCC	3	5	3	---
Total - labor	325	475	262	101
Other sources				
Boarders	3	---	4	9
Direct relief	---	---	---	1
Old-age assistance	20	22	24	5
Aid to dependent children	19	40	3	---
Unemployment insurance	6	11	2	---
Total - other sources :	48	73	33	15
Total non-farm receipts	373	548	295	116

1/ For the 12-month period, July 1939 to June 1940.

2/ Less than 0.5.

Summary of Family Income

The relative importance of farm and non-farm income can be realized from the data summarized in table 13, by size and kind of farm.

For the entire group of 129 surveyed farms, farming accounted for three-fifths (\$546) and non-farm sources for two-fifths (\$347) of the average net farm family income (\$893). Produce used in the household constituted about one-fifth of the income from farming. Total net cash farm family income was about equally divided between farming and non-farm sources.

The 92 full-time farms had an average net farm family income of \$875; for those with less than 20 crop acres it was \$512, those with 20 to 39 crop acres, \$786; and those with 40-and-over crop acres, \$1,264. The difference in income between the three size groups was due to a difference in net cash income from farming, although the medium and large farms did produce more for home use and had somewhat greater incomes from outside.

The 22 part-time farms had an average net farm family income of \$915 per farm and it was about the same among the small and medium-sized farms. Net cash income from farming was higher (\$160) among the medium-size farms than among the small (\$102), and the average non-farm cash income was also slightly higher, but the medium-size farms produced an average of only \$116 worth of goods for household use whereas the average for the small farms was \$213.

The average net farm family income on the 15 residence farms was \$928, of which \$874 was from non-farm sources and \$54 was income from farming. This last figure resulted from a net cash loss of \$60 from farming operations, but food and fuel used at home were worth an average of \$114.

TYPES AND AMOUNT OF NON-FARM EMPLOYMENT

About two out of five farmers in Carlton County worked off their farms for pay in 1934 according to the census report (table 14). The average number of days worked was 97, and half of them had more than 50 days or the equivalent of 2 months or more of work. ^{5/} Conditions in the county are such that probably there is more off-farm work now than when the census was taken. The wood-using industries in Cloquet have increased their employment and with improved business conditions there are more jobs in Duluth, just outside the county.

^{5/} United States Census of Agriculture, "Part-time Farming in the United States," Washington, D. C.; 1937. See table 14.

Table 13.- Average family income from farming and other sources, by kind and size of farm, 129 survey farms, Carlton County, Minnesota, 1940 1/

Item	Size of farm			
	All farms	Less than 20 acres	20 to 39 crop acres	40 and over crop acres
<u>Full-time farms</u>				
Number of survey farms	<u>Number</u> 92	<u>Number</u> 11	<u>Number</u> 41	<u>Number</u> 40
Net cash farm income	<u>Dollars</u> 665	<u>Dollars</u> 311	<u>Dollars</u> 498	<u>Dollars</u> 935
Value of produce used	<u>Dollars</u> 189	<u>Dollars</u> 152	<u>Dollars</u> 172	<u>Dollars</u> 216
Total farm income	<u>Dollars</u> 854	<u>Dollars</u> 463	<u>Dollars</u> 670	<u>Dollars</u> 1,151
Non-farm net cash income	<u>Dollars</u> 107	<u>Dollars</u> 49	<u>Dollars</u> 116	<u>Dollars</u> 114
Total farm family income ..	<u>Dollars</u> 961	<u>Dollars</u> 512	<u>Dollars</u> 786	<u>Dollars</u> 1,265
<u>Part-time farms</u>				
Number of survey farms	<u>Number</u> 22	<u>Number</u> 11	<u>Number</u> 11	<u>Number</u> ---
Net cash farm income	<u>Dollars</u> 131	<u>Dollars</u> 102	<u>Dollars</u> 160	<u>Dollars</u> ---
Value of produce used	<u>Dollars</u> 165	<u>Dollars</u> 213	<u>Dollars</u> 116	<u>Dollars</u> ---
Total farm income	<u>Dollars</u> 296	<u>Dollars</u> 315	<u>Dollars</u> 276	<u>Dollars</u> ---
Non-farm net cash income	<u>Dollars</u> 623	<u>Dollars</u> 592	<u>Dollars</u> 653	<u>Dollars</u> ---
Total farm family income ..	<u>Dollars</u> 919	<u>Dollars</u> 907	<u>Dollars</u> 929	<u>Dollars</u> ---
<u>Residence farms</u>				
Number of survey farms	<u>Number</u> 15	<u>Number</u> 11	<u>Number</u> 4	<u>Number</u> ---
Net cash farm income	<u>Dollars</u> -57	<u>Dollars</u> -64	<u>Dollars</u> -37	<u>Dollars</u> ---
Value of produce used	<u>Dollars</u> 110	<u>Dollars</u> 120	<u>Dollars</u> 81	<u>Dollars</u> ---
Total farm income	<u>Dollars</u> 53	<u>Dollars</u> 56	<u>Dollars</u> 44	<u>Dollars</u> ---
Non-farm net cash income	<u>Dollars</u> 952	<u>Dollars</u> 906	<u>Dollars</u> 703	<u>Dollars</u> ---
Total farm family income ..	<u>Dollars</u> 905	<u>Dollars</u> 962	<u>Dollars</u> 747	<u>Dollars</u> ---
<u>All farms</u>				
Number of survey farms	<u>Number</u> 129	<u>Number</u> 33	<u>Number</u> 56	<u>Number</u> 40
Net cash farm income	<u>Dollars</u> 488	<u>Dollars</u> 111	<u>Dollars</u> 394	<u>Dollars</u> 935
Value of produce used	<u>Dollars</u> 173	<u>Dollars</u> 162	<u>Dollars</u> 150	<u>Dollars</u> 216
Total farm income	<u>Dollars</u> 661	<u>Dollars</u> 273	<u>Dollars</u> 544	<u>Dollars</u> 1,151
Non-farm net cash income	<u>Dollars</u> 282	<u>Dollars</u> 516	<u>Dollars</u> 266	<u>Dollars</u> 114
Total farm family income ..	<u>Dollars</u> 943	<u>Dollars</u> 789	<u>Dollars</u> 810	<u>Dollars</u> 1,265

1/ In the 12-month period, July 1939 to June 1940.

The diversity of jobs at which farmers are employed is indicated by data collected in the survey in 1940. Among the 129 farmers visited the following occupations were found.

Private business

Poultry buyer
Carpenter
Bricklayer
Contractor
Custom trucker
Cement plant worker
Paper mill worker
Grain elevator worker
Steel plant worker
Railroad section worker
Gasoline truck driver
Farm laborer
Hardware store salesman
Bridge gang worker
Cooperative store worker

Public service

Highway "cat" driver
School-bus driver
Township road maintainer
AAA crop reporter
Mail carrier
County commissioner

In addition to service occupations such as trucking, merchandizing, and driving school bus, some farmers were engaged in manufacturing and construction. Many of the occupations listed are seasonal and come in the summer. Farmers having such jobs either do very little farming or other members of the family carry on the farm work. Of the operators in the survey who had jobs away from home, about two-thirds were employed in private business and one-third in some form of public service.

Table 14.- Number of farm operators reporting specified number of days worked off farm for pay in Carlton County, Minnesota, 1934

Number of days	Farms reporting		Percentage of all farms
	Number	Percent	Percent
Under 25	332	30	13
25- 49	194	18	8
50- 99	167	15	6
100-149	77	7	3
159-249	152	14	6
250 and over	169	16	6
Total	1,091	100	42

Source: United States Census of Agriculture, "Part-time farming in the United States," Washington, D. C., 1937.

INCOME EXPECTANCY IN FARMING

Farmers, credit agencies, and others concerned with the welfare of rural people are all interested in farm-income probabilities. The production and performance data gathered in the survey, the long-time data gathered on crop yields, and certain assumptions respecting future commodity prices, together make it possible to estimate the income expectancy on farms of various kinds, types, and sizes operated under various levels of managerial efficiency.

The procedure used in estimating income expectancy was (1) to select farms representative of typical situations; (2) to normalize the production of crops, livestock, and livestock products; and (3) to calculate the probable income, using an assumed set of prices. For the normalizing process, the acreage of crops each year in the 1937-40 period, the number of dairy cows each year in the 1938-40 period, and the average number of cows for 1933-37 were available for each farm. The AAA productivity indexes of the cropland were also available; these were helpful in estimating normal yields for each farm. 6/

After the normal income expectancy had been estimated for four to six farms in each size group, a representative farm for each size group was selected for the following illustrations.

A 15 Crop-Acre Dairy Farm

Farms with 15 acres of cropland usually have about 5 cows, 3 head of young dairy cattle, 1 horse, and 1 hog which is raised for home use. The crops consist of about 1 acre of potatoes, 3 acres of small grain, and 11 acres of hay. With the exception of the potatoes all of these crops are fed to livestock. Operators of these small farms usually must buy feed--such as dairy-cow ration, middlings, or oil meal--to supplement the crops produced. On farms of this size usually a part of the plowing and all of the seeding and binding of grain are hired, but on the example farm hiring is done for only the last two jobs.

For a 15 crop-acre farm the average crop production, livestock production, cash expense, and cash income are shown in table 15. Butterfat production amounts to 1,000 pounds of which 800 pounds are sold and 200 pounds are used on the farm. An average of one cull cow and three veal calves are sold each year. Livestock sales aggregate \$312 and potatoes \$39. The estimated cash expense is \$185, of which nearly one-half goes for purchased feed. The family normally uses farm produce worth \$150 at farm prices. The net cash farm income is \$166 which is the amount available from the farm for family living expenses and for savings. It will be noted that in this figure no deduction has been made for interest on the farmers' equity in the farm capital or for depreciation of buildings, machinery, and equipment. As such things are replaced the cost would have to come out of the net cash farm income. The estimated charge (under cash expenses) for repairs on buildings and machinery would take care of any usual upkeep costs.

6/ Average livestock feed requirements, materials required per acre of crops, and the assumed relative prices of products to be sold and of expense items are shown in tables 21, 23, and 24 in the Appendix.

Table 15.- Crop and livestock production and farm income on a 15 crop-acre farm, Carlton County, Minnesota

Item	Crop production and sales			Farm income and expense summary		
	Acreage	Yield	Amount	Price	Value	Item
Land use						
Potatoes	1	100	100	.50	37.00	Income
Oats	3	32	96			Crop sales
Clover and timothy	11	1.6	17.6			Livestock and livestock product sales
Cropland	15					Total cash farm income
Permanent pasture	42					Expenses
All other land	3					Seed
Total	60				37.00	Twine and miscellaneous crop
Livestock production and sales						
	Number	Production	Amount sold	Price	Value	Item
Horses	1	1 cull cow	1,000	.045	45.00	Potato spray
Milk cows	5	1,000 pounds	785	.30	235.50	Threshing
Butterfat		200 "	200	.08	16.00	Other machine hire
Veals	3	200 "				Feed
Young stock	1	50 chickens	60	.13	10.80	Misc. vet. and fees
Hogs raised	20	160 dozens				Machinery repair
Hens						Building and fence repair
Eggs						Hired labor
Total					307.30	Tractor, truck, auto
Summary						
						Total cash receipts
						Cash expense and interest
						Net cash farm income
						Farm products used in home
						Netfarm income

Naturally, such a small farm does not require all of the operator's labor and family labor that is available. The example farm actually requires the equivalent of only 120 man days. Hence, the operator would have the equivalent of 180 man days for working off the farm. There is more free time in summer than in winter, which is contrary to popular belief. The small acreage of crops does not demand much work in summer, and the livestock require much more care in the winter.

Suppose that instead of being about average in quality of land and crop yields, the farm was 25 percent below average. Total production of hay and grain would be less, and probably only four cows instead of five could be kept. The net cash farm income would then be \$126 instead of \$168. On the other hand, if the crop yields were 25 percent above average, six cows could be kept, more butterfat could be sold, and somewhat more feed would be bought. The net cash farm income would be about \$218.

The operator was assumed to be about average in managerial efficiency--that is, in management of the dairy enterprise. Suppose the operator had been below average as a dairyman and perhaps he had inferior dairy cows, or fed them less, or did not take as good care of them as the average operator. Suppose average production per cow were only 150 pounds of butterfat instead of 200 pounds. The operator likely would not buy as much feed so his expenses would be lower but he would have less butterfat to sell. In such a case the net cash farm income might be about \$125 instead of \$166.

Suppose that instead of being a dairyman of below-average efficiency, the farmer is above average. Perhaps he has cows of better breeding, and feeds them more efficiently so they produce 250 pounds of butterfat per cow instead of 200 pounds. More feed must be bought but more butterfat will be available for sale. The better-than-average dairyman on an average 15 crop-acre farm has a net cash farm income probability of about \$220.

The net-income probabilities on farms of 15 crop acres may be summarized for different grades of land and for different grades of managers as follows:

	Net cash farm income	Net farm income, including value of products used in the home
<u>Average dairyman</u>	<u>Dollars</u>	<u>Dollars</u>
Farm with average crop yields	166	338
Farm with crop yields 25 percent below average	125	295
Farm with crop yields 25 percent above average	220	390
<u>Average farm</u>		
With a below average dairyman	125	295
With an above average dairyman	220	390
Farm with 25 percent above average crop yields and with an above average dairyman	280	450
Farm with 25 percent above average crop yields and with a below average dairyman	95	265

A 25 Crop-Acre Dairy Farm

Farms with 25 crop acres usually have about 8 cows, 6 head of young cattle, 2 horses; 1 hog is raised for home consumption and about 25 hens are kept. On these farms there are usually 20 acres of hay, 4 acres of oats, and 1 acre of potatoes. All of the crops except potatoes are usually fed to livestock, and all hay needed is grown on the farm but dairy-cow feed is bought. Some machine work is normally hired, particularly grain drilling and grain binding.

The normal crop production, livestock production, cash income, and cash expense are shown in table 16. Butterfat production amounts to 1,600 pounds; 200 pounds are used on the farm, and 1,400 pounds are sold. Normal sales of livestock consist of two cull cows. Total crop and livestock sales amount to \$593 and total cash expense amounts to \$290, leaving a net cash farm income of \$334. The largest expense item is purchased feed, amounting to \$141. The family normally uses farm produce worth \$170 which when added to net cash farm income makes the net farm income \$504. The net cash farm income of \$334 is the amount available from the farm for family living and savings. No allowance was made for depreciation on buildings and machinery so when such items must be replaced, the cash available for family living would be lower.

The farm has cropland of average productivity and the operator has average managerial efficiency. As in the case of the 15 crop-acre farm, the income expectancy may be summarized on 25 crop-acre farms with various grades of land and with various grades of managers.

	Net cash farm income	Net farm income, including value of products used in the home
	Dollars	Dollars
<u>Average dairyman</u>		
Farm with average crop yields	334	504
Farm with crop yields 25 percent below average	230	400
Farm with crop yields 25 percent above average	393	563
<u>Average farm</u>		
Farm with an average dairyman	334	504
Farm with a below average dairyman	257	427
Farm with an above average dairyman	404	574
Farm with crop yields 25 percent above average and an above average dairyman	480	650
Farm with crop yields 25 percent below average and a below average dairyman	210	380

It must be remembered that these are estimates and may not be applied directly to particular farms, but as they are based on a study of actual farming conditions, levels of production, and performance, they do indicate the incomes that typical farmers can expect.

Table 16.- Crop and livestock production and farm income on a 25 crop-acre farm, Carlton County, Minnesota

Item	Crop production and sales			Farm income and expense summary		
	Acreage	Yield	Produc-: Amount	Price	Value	Item
			tion			Amount
Bushels Bushels Bushels						
Acres or tons or tons or tons Dollars Dollars Dollars						
Land use						Dollars
Potatoes	1	100	100	.50	37.00	Crop sales
Oats	4	32	128			Livestock and livestock
Clover and timothy	20	1.6	32			product sales
Cropland	25					Total cash farm income
Permanent pasture	50					
All other land	5					
Total	80				37.00	
Livestock production and sales						
Number : Production : Amount : sold : Price : Value						
Pounds or dozens Dollars Dollars Dollars						
Horses	2	2 cull cows	2,000	.045	90.00	Hired labor
Milk cows	8	1,600 pounds	1,400	.30	420.00	Tractor, truck, auto
Butterfat		450 "	450	.08	36.00	Taxes: Personal
Veals	6					Real estate
Young stock	1	200 "				Cash rent
Hogs raised	20	50 Chickens				Interest paid
Hens		160 dozens	60	.18	11.00	Insurance buildings
Eggs						Livestock bought
Total					557.00	Feed grinding
						Total cash expenses
Summary						
						Total cash receipts
						Cash expense and interest
						Net cash farm income
						Farm products used in home
						Net farm income

A 35 Crop-Acre Dairy Farm

Farms with 35 crop acres probably most closely resemble what most people think of as typical farms in Carlton County, although actually they are larger than average. Farms of this size usually have 10 dairy cows, about 7 head of young cattle, and 2 or 3 horses; usually 2 hogs are raised for family use and about 25 hens are kept. They usually are equipped with all the machinery needed except that some do not have grain drills or grain binders. The cropping system usually consists of 25 acres of tame hay, 5 to 8 acres of small grain (oats or barley), and 2 acres of potatoes.

The normal production of crops, livestock, and livestock products on a typical farm are shown in table 17. Butterfat production amounts to 2,000 pounds of which 240 pounds are used on the farm and 1,760 pounds are sold. Livestock sales consist of 2 cull cows and 5 veal calves, while annual egg sales amount to 100 dozens. Total sales bring in \$760, of which \$76 is from potatoes and \$684 is from livestock and livestock products. Of the total cash expense (\$316), purchased feed constitutes nearly one half (\$150). Net cash farm income is estimated at \$434 and net farm income amounts to \$604 when the value of produce used in the home is added. This is the income expectancy on a farm with average land and an operator of average efficiency.

The income expectancy may be summarized for farms with various grades of land and various grades of operators, as follows:

	Net cash farm income	Net farm income, including value of products used in the home
<u>Average dairyman</u>	<u>Dollars</u>	<u>Dollars</u>
Farm with average crop yields	424	594
Farm with crop yield 25 percent below average	314	494
Farm with crop yields 25 percent above average	524	694
<u>Average farm</u>		
With an average dairyman	424	594
With a below average dairyman	354	524
With an above average dairyman	494	664
Farm with 25 percent above average crop yields and with an above average dairyman	650	820
Farm with 25 percent below average crop yields and with a below average dairyman	230	410

A 45 Crop-Acre Farm

Typical 45 crop-acre farms have 12 dairy cows, 9 head of young cattle, and 3 horses, and keep 2 pigs and 25 hens for family use. The usual cropping system includes 2 or 3 acres of potatoes, 10 to 15 acres of small grain (usually oats), and 25 to 35 acres of tame hay. Farms of this size usually have all of the machinery and other equipment needed and hire only the job of grain threshing.

The estimated normal production of crops and livestock, cash income, and cash expenses for a typical farm are found in table 18. Of total sales amounting to \$923, crops (potatoes) account for \$120 and livestock, \$803. Feed bought is the largest item of cash expense, amounting to \$145. Total cash expense is \$369, leaving a net cash farm income of \$563. Net farm income is estimated at \$733. This figure is for a farm with average land operated by an average dairyman. The income expectancy of farms of various grades of land and various grades of managers may be summarized as follows:

	Net cash farm income	Net farm income, including value of products used in the home
<u>Average dairyman</u>	<u>Dollars</u>	<u>Dollars</u>
Farm with average crop yields	563	733
Farm with crop yields 25 percent below average	386	556
Farm with crop yields 25 percent above average	744	914
<u>Average farm</u>		
With an average dairyman	563	733
With a below average dairyman	439	609
With an above average dairyman	669	839
Farm with 25 percent above average crop yields and an above average dairyman	924	1,094
Farm with 25 percent below average crop yields and a below average dairyman	494	664

On farms having crop yields that are 25 percent above average, 12 tons more of hay and 3.3 tons more of grain would be available than on farms of average yields, if the same cropping system were followed. The additional hay would permit the farmer to keep 3 more cows. As the amount of pasture per cow would be lower, some hay could be substituted for pasture. On farms with yields 25 percent below average only 9 cows (instead of 12) could be kept unless additional feed were bought. As farmers in the area tend to keep the number of cows for which they can grow roughage, the number of cows would probably be 9 on the poorer farms and 15 on the above-average farms, depending of course upon whether the labor supply was adequate.

Table 18.- Crop and livestock production and farm income on a 45 crop-acre farm, Carlton County, Minnesota

Item	Crop production and sales			Farm income and expense summary		
	Acreage	Yield	Produc-:tion	Amount	Price	Value
<u>Land use</u>						
	Acres	Bushels	Bushels	or tons	or tons	Dollars
Potatoes	3	100	300	240	.50	120.00
Oats	12	35	420			
Clover and timothy	30	1.6	48			
Cropland	45					
						<u>Income</u>
						Crop sales
						Livestock and livestock
						product sales
						Total cash farm income
Permanent pasture	70					
All other land	5					
Total	120					
						<u>Expenses</u>
						Seed
						Twine and miscellaneous crop
						Potato spray
						Threshing
						Other machine hire
						Feed
						Misc. vet. and fees
						Machinery repair
						Building and fence repair
						Hired labor
						Tractor, truck, auto
						Taxes: Personal
						Real Estate
						Cash rent
						Interest paid
						Insurance buildings
						Livestock bought
						Feed grinding
						Total cash expenses
<u>Livestock</u>						
	Number	Production	Amount	Price	Value	
			or dozens			
Horses	3					
Milk cows	12	2 cull cows	2,000	.045	90.00	
Butterfat		2,400 pounds	2,140	.30	642.00	
Veals		660 "	660	.08	53.00	
Young stock	9					
Hogs raised	2					
Hens	25	50 chickens				
Eggs		200 dozens	100	.18	18.00	
Total					803.00	
						<u>Summary</u>
						Total cash receipts
						Cash expense and interest
						Net cash farm income
						Farm products used in home
						Net farm income

Income Possibilities in Special Enterprises

Up to this point the income expectancies have been discussed for dairy farms each with an acre or two of potatoes. Most Carlton County farms are of this type. But some of the farms have sidelines of cabbage, poultry, hogs, or sheep. The discussion of these enterprises can best be handled individually--it is concerned with what success farmers have in them and the possibilities if other farmers enter them.

Cabbage.- Most of the cabbage is grown in Silver Brook and Twin Lakes townships where the soil is suitable for this crop. It requires a light surface soil but there should be a deep subsoil to hold underground moisture. The soil elsewhere in the county is generally unsuited to the crop.

The labor requirement is somewhat greater than in the case of potatoes particularly if the cabbages are hand stripped of outer leaves at the time they are marketed. The young plants are usually started in cold frames and are later set out with a special planter. The planting requires a crew of 4 to 6 persons, 3 to operate the planter and from 1 to 3 to pull seedlings. Two acres is an average day's work. Spraying and cultivating require about the same amount of labor per acre as for potatoes. The limited information available on harvesting cabbage indicates that the labor required per acre is about double that of potatoes, largely owing to the greater tonnage. A considerable portion of the crop is stored in root cellars and marketed later during the winter and early spring. If marketed at that time, the outer leaves must be stripped off by hand.

A few farmers truck their cabbage to wholesale or retail markets in Duluth or Superior, but most of the crop is sent to Minneapolis and to even more distant markets. The estimated return per acre of cabbage is as follows:

Receipts:

7 tons of marketable product @ \$8	\$56.00
------------------------------------	---------

Expenses:

Seed: 1/2 pound @ \$3.50	\$ 1.75	
Spray	3.00	
Interest on land value	1.50	
Taxes on land	1.25	
Marketing costs @ \$2.50 per ton <u>1/</u>	<u>17.50</u>	<u>25.00</u>
Net returns to operator and family labor		\$31.00

1/ Stripping and sacking.

Cabbage is a high-risk enterprise in Carlton County because of competition in the general midwestern market. When the total production in the whole country is above normal the price is driven down. In 2 out of the last 3 years before the war the Surplus Marketing Administration supported the market and helped Carlton County farmers to dispose of their crop. The net price to the producer was about \$5 per ton after marketing costs were deducted. In the third year, producers received as high as \$20 per ton for their crop.

Poultry.- Almost all poultry raising in the county depends on purchased feed because the farmers grow comparatively little grain. If they are to engage in general poultry and egg production, farmers in the county must compete with farmers in surplus-grain areas such as the Corn Belt. Carlton County is in a poor competitive position in respect to the general poultry and egg markets because local feed prices represent the Corn Belt farm price plus marketing and transportation costs. To compete successfully, Carlton County producers must be very efficient in feeding and in other practices. Some producers are able to make a profit because they have special markets for high-quality eggs, broilers, or capons in nearby cities, perhaps in Duluth or Superior.

In former years, particularly in the period 1920-30, there was a favorable local market for eggs. With the advent of motortrucks, eggs were more easily shipped into the area and as more of the farmers now keep poultry, there is probably somewhat greater competition locally. As a result, the differential between the local price and the price in central markets has decreased.

Farmers with exceptional ability in managing poultry can make a profit when poultry prices are favorable compared with feed prices. Following is an estimate of the receipts, expenses, and net returns that may be expected from a flock of 100 hens as usually managed by local producers who have 75 to 200 hens.

Eggs are the principal product sold, but of the 150 chickens raised each year, the cockerels are sold. The pullets are used as replacements.

Returns from a flock of 100 hens 1/

Receipts:

900 doz. eggs @ \$.18	\$162.00	
60 cull hens @ .40	24.00	
75 young chickens @ .40	30.00	\$216.00

Expenses:

200 chicks @ .10	20.00	
Medicine, disinfectants, brooder stove fuel, etc.	15.00	
8,000 lb. of grain mash, meat scraps, and other feed	140.00	175.00

Net return		\$ 41.00
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1/ For light breeds such as leghorns.

Farmers who have abundant quantities of skim milk could substitute up to 7,000 pounds of it for high-protein feeds purchased, and thus reduce feed costs by 15 to 20 dollars. These estimates assume a higher-than-average standard of management.

Hogs.- In Carlton County hogs are not generally produced for market because of the unfavorable competitive position compared with the Corn Belt. The climate is unsuited to corn production and as most of the limited crop of small grain is absorbed by the dairy enterprise, practically all feed for hogs is bought. Even with comparatively high prices for the animals, most farmers are unable to get very much more for their hogs than the costs of the feed they have used. Even in the Corn Belt, large profits from hogs depend on a large volume of business which is impossible to attain in Carlton County.

Sheep.- There are only about 5,000 sheep in the county; this averages about 2 per farm. Even a small flock of 15 to 25 ewes requires more pasture than most dairy farmers have to spare. Farmers who want to keep sheep must also consider the cost of additional fencing. Those who have a large area of brush pasture might find that it would pay to keep a few ewes, but as the farms are generally small, few could keep enough sheep to add substantially to their income.

Vegetables and Fruit.- Vegetable and fruit growing should be considered as possible enterprises on farms in the cut-over area. An indication of the extent of commercial vegetable growing in Carlton County is shown by data from the U. S. Census of Agriculture, 1940. The census reported the number of farms engaged and the total acreage of certain vegetables and fruits grown for sale in 1939 (table 19).

These figures may exaggerate the actual situation in that probably not all of the production from the reported acreage was sold; some of it was undoubtedly consumed by the farm families themselves and by their neighbors. Locally-grown vegetables probably fall far short of supplying local demand although specific information is not available. To what extent the nearby Duluth market is fully supplied in season by products that can be grown in the area or whether the soil is well suited to growing vegetables is not known. In general, the soil requirements for vegetables are rather specific, but as the acreage needed is relatively small, amenities could be added and the soil could be modified. Taking all factors into consideration, the opportunity for expanding vegetable production on a commercial basis is probably rather limited but the production and consumption of vegetables by the farm family could well be increased.

A much more hopeful possibility is found in the growing of small fruits, particularly raspberries, strawberries, and blueberries. Raspberries and blueberries are native to the area but as they grow in abundance on wild land, the chance to sell farm-produced berries in local markets is lessened. Until varieties of cultivated berries are developed which are suitable to the area and until proper markets are developed for the products, no great increase in this enterprise can be expected.

Table 19.- Number of farms reporting and acreage of certain vegetables and small fruits grown for sale, Carlton County, Minnesota, 1939

Item	Number of farms reporting	Total acreage
	<u>Number</u>	<u>Acres</u>
Vegetables		
Beans (snap or string)	11	2
Beets	10	2
Cabbage	135	500
Carrots	36	16
Sweet corn	15	17
Cucumbers	15	9
Onions	12	3
Rutabagas	32	26
Tomatoes	9	2
All other vegetables <u>1/</u>	<u>2/</u>	222
Total	<u>3/</u> 179	799
Small fruits		
Blueberries	9	14
Raspberries	211	50
Strawberries	195	49
Total	<u>3/</u> 345	113

U. S. Census of Agriculture, 1940.

- 1/ Including mixed vegetables.
2/ Not available.
3/ Not a total of items in the column.

PROSPECTS FOR FURTHER AGRICULTURAL DEVELOPMENT

Prospects for further agricultural development in Carlton County are not wholly favorable or wholly unfavorable. Based on the actual rate of new development in the last 10 years, future prospects are not very bright. Based upon farming possibilities as shown by what some operators have done, the prospects are not discouraging. One thing is certain, there is room for improving the present agricultural economy by so adjusting the farming units that they will suit the needs of particular farmers better.

Further development may conceivably take any one or a combination of forms: Converting new land into new farms, adding new land to existing farms, bringing more land into cultivation on existing farms, and improving the productivity of existing cropland. Before appraising each of these possibilities, it is worth while to review what has happened during recent years.

Recent Trends

The trends in number of farms, acres of cropland, and number of livestock during the last 10 years indicate that agricultural expansion in Carlton County has practically stopped. Although there were above 500 more farms in 1935 than in 1930, as reported by the census, in 1940 there were 100 fewer farms than in 1935. The increase between 1930 and 1935 generally has been attributed to the landward trek during the depression and did not necessarily indicate a healthy situation. The number of farms as reported by the State Farm Census showed no increase between 1930 and 1940; this raises the legitimate question whether there actually was any expansion of farming during the decade. It is common knowledge that some new farms have been developed and that some farmers have cleared more land during this period. But that some abandonment has occurred is less commonly realized. The acreage of cropland and the number of livestock per farm have remained about the same during the last 10 years, indicating no intensification of land use.

Land clearing had been stimulated more recently by the introduction of the bulldozer, which many claimed was very efficient in removing stumps and brush. The bulldozer is a heavy steel blade mounted on the front of a crawler-type tractor. The blade can be raised or lowered by the operator. The machine may be used to push over, uproot, and windrow or pile the stumps; and when the blade is set close to the ground it will cut small brush. The machine may also be used to remove and bury stone or to level land. At the time of the study it appeared to be most successful in removing old rotten stumps and light brush and had not been thoroughly tested under the most difficult land-clearing conditions.

There was evidence that much of the clearing that occurred during the last few years was not on the farms most in need of it--that is, the small subsistence farms. Men working in other jobs have cleared land which they hoped to develop into farms eventually; in case of possible unemployment. Meanwhile they work on the land only in their spare time. Operators of full-time farms were also doing some clearing, mainly old stump pasture, which they had always intended to do but which until the bulldozer came along just never got done.

Lack of clearing activities on small subsistence farms may be explained in various ways. Some farmers, of course, have no more land that is suitable for clearing; others need their suitable land for pasture. In both of these cases another 40 or 80 acres are needed, on which to develop either cropland or pasture. But a subsistence farmer does not have enough cash to make a down payment, or, if he could make the down payment, he would have the expense for clearing, which has always been high--in labor costs if not in cost of materials. Finally, many of the subsistence farmers are past middle age and are not able to do heavy work. In most cases the son has left the farm because, even if he helped clear more land, the farm would not support two families. When the present generation passes on, many of the new generation of young farmers will need help to develop these small units into family-sized farms.

Possible Future Developments

Undoubtedly there is land in the county now undeveloped which would be suitable for farming. According to the Land Use Classification map of the county (prepared by community land use planning committees with the technical help of the Extension Service), there are areas including about 83,000 acres where new farms could be located. Not all the land in these areas is potential cropland and some areas are isolated from settled communities.

Undoubtedly on many farms there is land suitable for cultivation which has not been developed. The original settlers did not always clear the best land because it was often hard to know what was best, or the best land was farthest from the settlers' cabins.

Another possibility of solving the local land problem is a better distribution of the cropland now available. Many of the well-developed farms in the county are occupied by persons who receive old-age assistance and are not using the farm resources to the fullest. In some cases the farm serves merely as a place to live and the family support comes entirely from public assistance; in other cases only a small part of the family living is produced by means of one or two cows, a few hens, and a garden. Based on the survey, an accurate estimate cannot be made of the number of these farms on which the resources are only partially used, but as there are about 700 old-age pensioners in the county, most of whom are in rural areas, the number must be great.

The possibilities should be explored of an arrangement whereby rural families in need of farms might get the use of farm resources which are now only partially used while the pensioners continue to occupy their present homes or other homes comparable to them. In rough outline it might even be possible for some Government agency to develop a pensioners' settlement in each community, in which case the pensioner would exchange his own holding for the use of a settlement home, and then the agency could sell his former holding to a young farmer; the proceeds of the sale applying to the cost of the project.

Certain adjustments in land-use practices could be made which would increase the productivity of the land now being farmed. The two management practices which appear to have the most promise are a greater use of legumes for hay and pasture, and improved crop rotations. Alsike and red clover have been used since the settlement of the county but the management of hay meadows has not led to maximum production. Many fields have not been plowed and reseeded for 15 or more years. Lack of initiative, lack of power and tools, the uncertainty of getting a stand, the difficulty of plowing stony soil, are among the reasons. Two or three years after seeding, the timothy and quack grass choke out the clover and alsike, thereby reducing both the yield and quality of the hay crop. It is believed that if the hay meadows were rotated more frequently with other crops, the production of hay and the other crops would be increased.

The use of commercial fertilizer has not as yet received much consideration in the county. Very little fertilizer is used except for potatoes and cabbage. The extent to which the fertility of these generally thin forest-type soils has been maintained is probably owing to the application of barnyard manure, to the pasturing of animals, and to the fact that the soils have been cropped a relatively short time. It is generally believed in the county that commercial fertilizer is not economical for hay and small-grain crops, especially on the small farms which have more livestock per crop acre.

MEANING OF STUDY TO CUT-OVER FARMING

The results of this study have a wider application than to Carlton County alone because the agriculture of much of the cut-over forest area of the Lake States is very similar to that of Carlton County. Certain characteristics of cut-over farming, its limitations, and its possibilities are apparent.

Farms in the cut-over area are small both in total acreage and in acres of cropland. The average size of farms measured in terms of cropland is indicated in figure 2 for various parts of the cut-over. It is noteworthy that in general the average number of crop acres per farm decreases from the southern periphery toward the heart of the area. Carlton County stands about midway in this range. Not only the acreage of crops but also the farm business on cut-over farms is small, measured in man work units and volume of production. The economy of the area is characterized by part-time farming and work off the farm. The extent of non-farm employment in the cut-over counties is indicated in figure 3 which shows the percentage of all farmers who worked 25 or more days off their farms for pay in 1934. This map shows a pattern strikingly similar to that in the preceding map of crop acres per farm (fig. 3). In those counties where the acreage of crops per farm is low, the percentage of farmers who have outside employment is high; some of them make a satisfactory living by combining farming and other work. There are also many operators who are trying unsuccessfully to make a go of farming alone.

Agriculture in the cut-over area has other handicaps besides small size of farms. There are few alternatives to dairying because of the short growing season, the thin forest soils, and the distance from central markets. None are close alternatives. It is not economical to intensify the dairy enterprise to the point where it will keep the average operator and his family busy full-time. Every farm commodity that this area can produce in excess of local demand competes with commodities produced in other areas that are more generally favored. These factors combine to limit seriously the income possibilities in farming here.

Results of the study indicate the need for a stable supplementary source of income for many small-scale farmers in the cut-over country. The type of part-time employment really needed is one in which the settler could work half days or full days, a few weeks or several months--whenever he had the time to spare from his farm. For stability, this work should be tied to a renewable natural resource. It is believed that woods work would meet these requirements.

AVERAGE CROP ACRES PER FARM, 1940 LAKE STATES CUT-OVER COUNTIES

CROP ACRES

15 - 24
25 - 34
35 - 44
45 and over

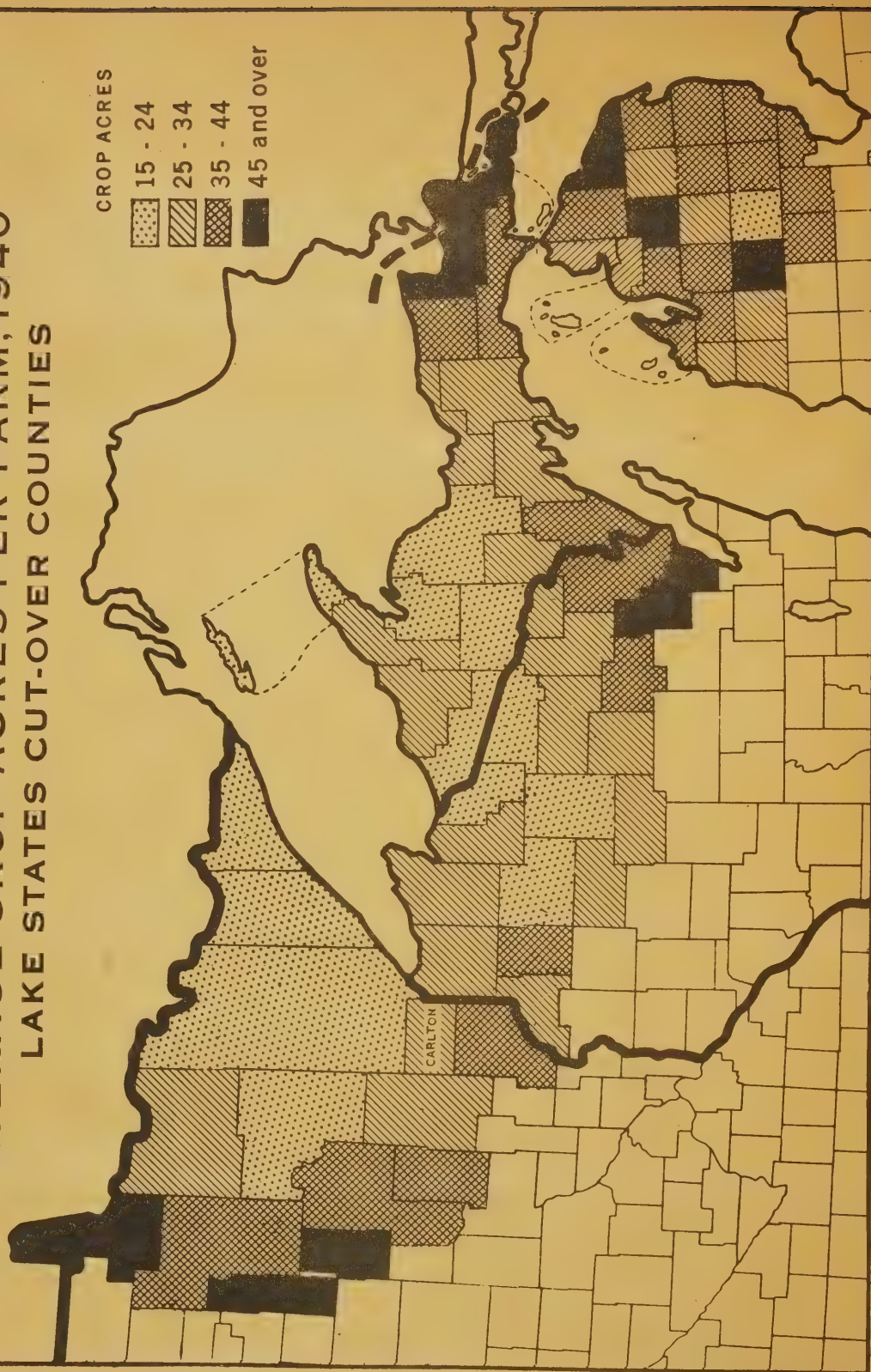


Fig. 2

PERCENTAGE OF ALL FARMERS WHO WORKED 25 OR MORE
DAYS OFF THEIR FARMS FOR PAY, 1934
LAKE STATES CUT-OVER COUNTIES

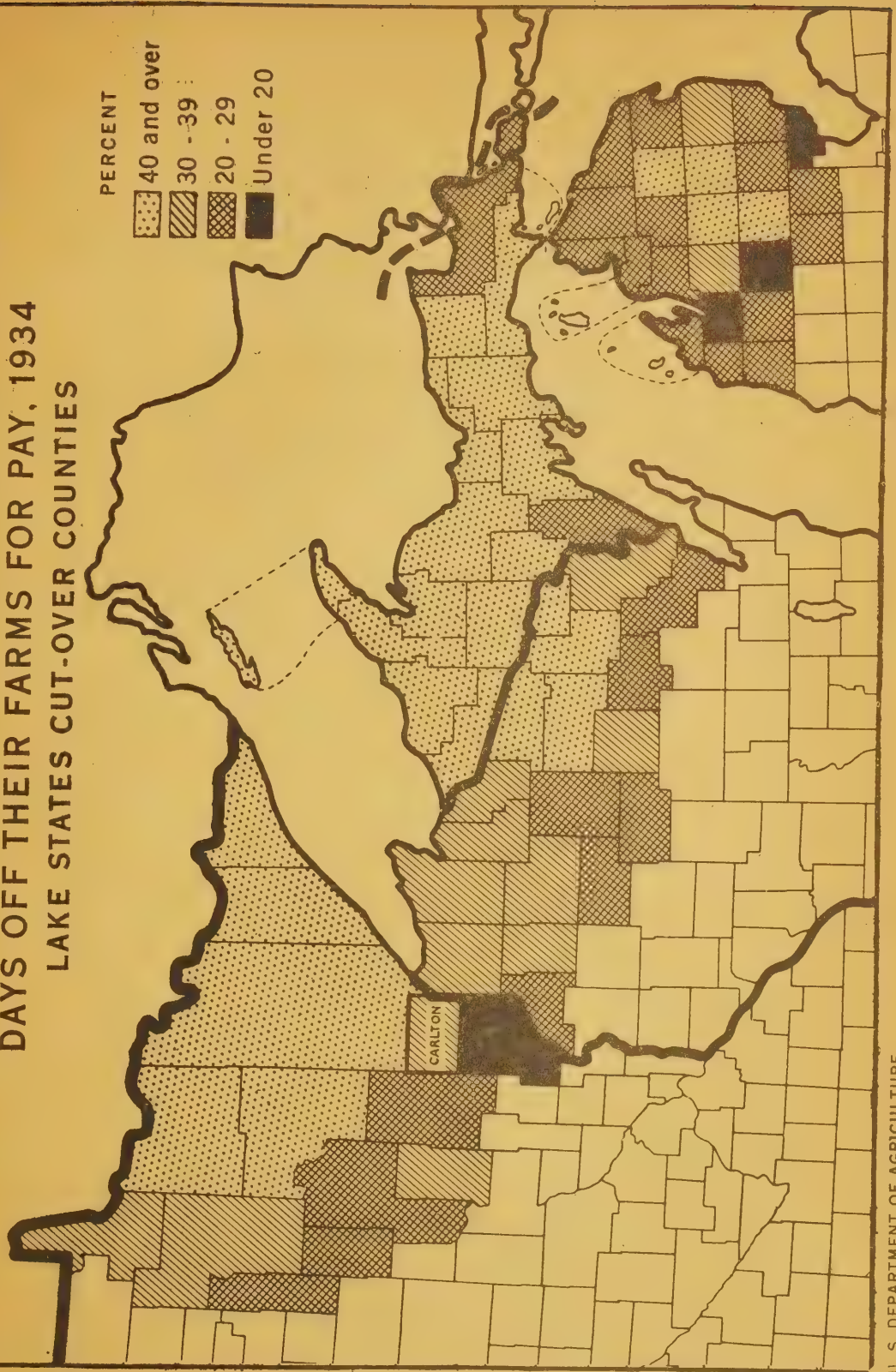
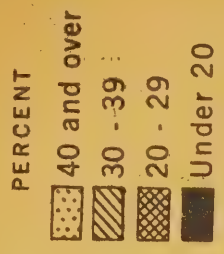


fig. 3

But owing to their present depleted conditions the forests in the cut-over country provide only a fraction of the work that would be available if they were restored to their original productivity.

If the forest lands were reestablished there would be a place for community forest management, using the part-time labor of farmers. The place for community forests would be in the smaller tracts interspersed among or on the fringes of present farming communities. Such tracts are not well adapted to large-scale management by private owners or by State or Federal agencies, nor are they adapted to large-scale cutting operations by commercial loggers. But they are suited to management as community forests and would form an integral part of the whole forest economy.

This study shows when other income-producing work is available that part-time farming can be successfully conducted in the cut-over country. It indicates further that some type of part-time employment, such as work in the woods, may be successfully combined with farming as a means of making a more satisfactory living than is generally possible now from farming alone.

APPENDIX

Calculation of Income Expectancy

For those who are interested in the method used in estimating normal income expectancy, the following explanation and data are added.

Briefly, the method consisted of normalizing the organization of representative farms, estimating average production of crops and livestock and the quantities for sale, applying the assumed schedule of prices, and calculating expenses and receipts.

To determine the normal organization--that is, the usual acreage of crops and number of livestock on the farm--the data collected in the survey were used but they were supplemented with data from the records of the Agricultural Conservation Program. From these records were obtained the acreage of various crops each year from 1937 to 1940, the number of dairy cows in 1938, and the average number of dairy cows from 1933 to 1937. In cases where considerable change in organization had occurred, the operator was asked whether the change was permanent or due to an unusual or accidental circumstance; for instance, some herds had been decimated by Bang's disease.

Having determined upon the normal organization for each farm, the next step was to estimate normal yields of crops and normal production of livestock.

Crop yields for the year 1939 had been obtained on the survey schedule, but long-time yields were needed and of course they are not available by farms. Long-time (20-year) average yields for the county were available (table 20), so the problem was to adjust them to conditions on a particular farm. In the Agricultural Conservation Program, farms have productivity indexes based on the county average. These indexes were used to adjust the county yields to particular farms, and these adjusted figures served as a first approximation.

Livestock production for 1939-40 had been obtained on the survey schedule. Operators were questioned whether production that year had been affected by any abnormal circumstance and if so, what would be the normal production. In most cases the livestock enterprise had fluctuated very little for several years. It was necessary to make minor adjustments between livestock and crops, to balance feed production and feed requirements. The basic feed requirements as used in this study are shown in table 21. On individual farms, requirements naturally varied somewhat from the average. The relationship between rate of concentrate feeding and butterfat production per cow, as found on the surveyed farms in 1939-40, is shown in table 22.

The materials and average amounts required per acre are found in table 23.

The assumed relative prices of products to be sold and the assumed expense items are shown in table 24. These prices are not submitted as predictions of future average prices; they are merely averages of recent years.

Table 20.- Average yield per acre of specified crops,
Carlton County, Minnesota, 1917-39

Crop	Bushels or tons	Pounds	Pounds of total 1/ digestible nutrients
Oats	35	1,130	785
Barley	25	1,195	921
Rye	18	991	812
Spring wheat	14	870	689
Potatoes	104	6,240	---
Corn	27	1,500	1,222
Tame hay	1.5	3,000	1,450
Wild hay	1.2	2,400	1,152

Source: "Minnesota Annual Crop and Livestock Statistics."

1/ Calculated from data in "Feeding the Dairy Herd," Minn. Exp. Sta. Bul. 218,
(Revised) January 1938.

Table 21.- Estimated quantity and kind of feed required per unit
of specified livestock, Carlton County, Minnesota

Item	Feeding period	Production level	Concen- trates	Rough- age	Pasture	Whole milk	Skim milk
			Pounds	Pounds	Days	Pounds	Pounds
Dairy cow	Year	150	800	4,000	160	---	---
	"	200	1,200	4,750	160	---	---
	"	250	1,600	5,500	150	---	---
	"	300	2,000	6,250	150	---	---
Replacement heifer	1st yr.	---	300	700	---	200	3,000
	2nd yr.	---	300	3,000	150	---	3,000
Bull	Year	---	800	5,000	150	---	---
Veal calf	6-10 wk.	100-140 lb.	---	---	---	400-500	---
Hogs (Cwt.produced)	5- 7 mo.	100 lb.	285	---	---	---	1,300
Poultry (100 hens)	Year	1,000 doz.					
		eggs	7,000	---	---	---	14,000
		250 lb. meat					
Horse	Year	work 25 days	400	5,000	125	---	---
	"	" 50 "	800	5,500	110	---	---
	"	" 75 "	1,200	6,000	95		

Table 22.- Relation between rate of concentrate feeding and butterfat production per cow, Carlton County, Minnesota

Butterfat produced per cow	Number of farms	Concentrates fed per cow		
		Arithmetic average	Standard deviation	Standard error of mean
Pounds	Number	Pounds	Pounds	Pounds
Under 125	1	368	---	---
125-174	6	816	158	71
175-224	27	1,100	296	57
225-274	9	1,670	217	77
275-324	5	2,256	572	286
325 and over ...	2	1,588	---	---
All farms ...	50	1,289	432	62

Table 23.- Materials required per acre of crops, Carlton County, Minnesota

Crop	Item	Amount	Crop	Item	Amount
Oats	Seed	3 bu.	Tame hay	Seed-Red Clover	5 lb.
	Twine	2-1/2 lb.		Alsike	5 lb.
				Timothy	3 lb.
Barley	Seed	2 bu.	Potatoes	Seed	12 bu.
	Twine	2 lb.		Spray	5 bu.
Wheat or rye	Seed	1-1/2 bu.			
	Twine	2 lb.			

Table 24.- Assumed relative prices of products to be sold and of expense items, Carlton County, Minnesota ^{1/}

Products for sale		Expense items	
Item	Price	Item	Price
	Dollars		Dollars
<u>Cash crops</u>		<u>Feed</u>	
Potatoes, bu. ....	.50	Corn, cwt.	1.00
Rutabagas, ton	8.00	Barley, cwt. ....	.80
Cabbage, ton	10.00	Middlings, cwt.	1.20
		Oil meal, cwt.	2.00
<u>Livestock and products</u>		Dairy ration, cwt.	1.35
Butterfat, lb. ....	.30	Poultry feed, cwt.	1.65
Cows, cwt.	4.00		
Heifers, cwt.	6.00	<u>Seeds</u>	
Veal calves, cwt.	7.50	Alsike ....	.25
Hogs, cwt.	7.00	Red clover ....	.25
Chickens, lb. ....	.12	Timothy ....	.08
Eggs, doz. ....	.18	Rutabagas ....	.50
		Cabbage	3.00
		<u>Machine work hired</u>	
		Plowing, acre	2.00
		Drilling grain, acre ....	.50
		Binding grain, acre	1.75
		Feed grinding, cwt. ....	.10
		<u>Miscellaneous</u>	
		Bull service	2.00
		Baby chicks	7.50
		Threshing, oats or	
		barley, bu. ....	.05
		wheat or rye	.07
		Twine, lb. ....	.10
		Potato spray, lb. ....	.15

^{1/} These prices are not predictions. Greater importance should be attached to their relation to each other than to their absolute level.